BRAIN CONTROL WHEELCHAIR

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Abstract— *We have seen numerous individuals across the globeborn with physical disabilities. Some of them are born with disabilities which make them difficult for the movement and they need someones assistance for their movement, finding someone who can assist them all the time is very difficult. So, in this project to beat the constraints of beforehand existing innovations we have utilized Electroencephalogram (EEG) signs to work the wheelchair and this innovation is called mind PC interface (BCI) in which the human cerebrum collaborates with the PC to play out a specific assignment*

Key Words: **EEG, Brain computer interface (BCI) ,MIND WAVE MOBILE.**

1.INTRODUCTION

Research on brain-computer interface (BCI) began in the 1970s. Most of the studies have concentrated on the BCI for control of prosthesis, rehabilitation and interfaces for users with motor disabilities. The animal experiments and neuroprosthetic gadgets embedded in human's experi can do to control robotic wheelchairs in the near future. The brain robotic wheelchair interface becomes an important trend for human-robotic wheelchair interfaces in the future as described in "A Roadmap for US Robotic Wheelchair". Recently, business mind PC interface gadgets are arising in gaming industry. These noninvasive BCI gadgets interpret the electrical bio signs of a mind straightforwardly into PC orders and take advantage of total immersion into game play. They bring the BCIs from the laboratory to the public. It seems that the application of turning "thought into action" may soon become reality. On the other hand, the human machine interfaces of robotic wheelchairs, especially industrial robotic wheelchairs, are still dominated by traditional teach pendants (buttons, joysticks, etc.). Even now the intelligent robotic wheelchair systems can perform the manufacturing, assembly, machining, material handling, and etc. tasks with high autonomy and adaptability to the environments. Various types of sensors are integrated into robotic wheelchair systems, such as simple photoelectric sensors, more advanced ultrasonic sensors, laser sensor, radar sensor, and complicated force sensor and vision sensor systems. The information from these sensors assists and guides the robotic wheelchair to carry out high accuracy and reliability required tasks.

2.RELATED WORK

The Mind Controlled Wheelchair (BCW) is a basic automated framework intended for individuals, like secured individuals, who can't utilize actual interfaces like joysticks or catches.Our objective is to build up a framework usable in emergency clinics and homes with insignificant foundation adjustments, which can assist these individuals with recapturing portability. The principle challenge is to give persistent and exact 2D control of the wheelchair from a Mind PC Interface, which is commonly described by a uninformed exchange rate. Furthermore, as plan requirements, we need our BCW to besafe, ergonomic and moderately ease. Thesystem we propose depends on 1) con-stressing the movement of the wheelchair along predefined directing ways, and 2) a lethargic however exact P300 EEG cerebrum interface to choose the objective in a menu. This technique decreases control to the determination of the proper objective, subsequently requires littleconcentration exertion from the client. Furthermore, the direction is unsurprising, which adds to diminishing pressure, and disposes of dissatisfaction that might be related with directions produced by a counterfeit specialist. Two quick BCIs are proposed to permit halting the wheelchair.mixture BCI was created to consolidate the sluggish P300 BCI utilized for objective determination with a quicker methodology to stop the wheelchair while moving.

3. PROPOSED SYSTEM

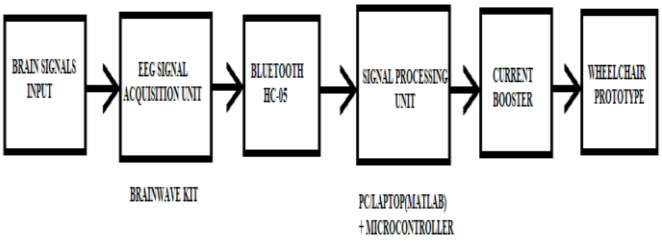

Fig -1 Block diagram

There BCI is a device to provide a direct interface between human brain and computer. The users just need to think of movement in order to drive the system. Therefore, the usage of BCI is one of the prominent devices for enabling the severely impairment user to control a wheelchair. For this project an Electroencephalogram (EEG) signal generated from a single electrode placed on the forehead will be used as a controller to initiate user-intention command. Meditation levels and eye blinks are detected from the EEG signal.

3.1 Description of the Proposed System:

To design the entire system, the components needed are:

Component	Specification
Arduino	Arduino Uno
Brain sensor	Mindwave Mobile
Driver	ICl293D
Motor	DC motor
Bluetooth Module	Module (HC-05)

Other's connectors, power cable, Miniature wheelchair, Battery.

Human knowledge by examining the Cerebrum utilizing the investigation of BCI - Mind PC interface. In this undertaking oneof the low-cost EEG Measuring devices Brain sense is used. And as an option it also supports Neurosky mindwave mobile.

4. METHODOLOGY

It comprises of a terminal situated in front facing position of the client scalp. The electric movement of mind is detected by the anode and the relating esteems are recorded. These signs are planned at a pace of 512 SPS (tests each second). The recorded qualities are then communicated twoly, by means of USB link and through Bluetooth.Analysis of this EEG signal is done using Lab VIEW software. It is feasible to gather and store information from Neurosky Psyche Wave head set and applying signal molding method. A reasonable calculation is applied to distinguish the order for the wheel seat contingent on the consideration and reflection level. The Lab VIEW programming in the PC, subsequent to playing out the above cycle and distinguishing the order, creates relating information signal. This sign is level moved utilizing Max 232 IC to interface with microcontroller. The regulator distinguishes the order and creates relating control signal, and sends it to engine control hardware. Engine control hardware starts comparing action of the engine driven wheel seat. In this way, the client can move the wheel seat securely.

4.1 ARDUINO UNO

The Uno is a microcontroller board dependent on the ATmega328P. It has 14 computerized input/yield pins (of which 6 can be us, a 16MHz quartz precious stone, a USB association, a force jack, an ICSP header andset button. Each of the 14digital pins can be utilized as an information or yield, utilizing pinMode, digitalWrite and digitalRead capacities. They work at 5 volts. Each pin can give or get 20 Mama as suggested working condition and has an inner draw up resistor (separated of course) of 20-50k ohm. A limit of 40mA is the worth that should not be surpassed on any I/O pin to keep away from lasting harm to the microcontroller.

4.2 MINDWAVE MOBILE

The Neurosky headset was used to get raw brainwave signals from the users. The raw EEG has usually been described in terms of frequency bands: GAMMA greater than 30 (Hz) BETA (13-30 Hz), ALPHA (8-12 Hz), THETA (4-8 Hz), and DELTA (less than 4 Hz). The headset is ascertaining through a chip the Crude EEG to create the eSense Meters and yield it to the PC. On the other hand, the Emotiv EPOC Headset is a neural-signal acquisition and processing wireless neuroheadset with 14saline sensors being able not only to detect brain signals but also users' facial expressions.

Fig -2: Mind wave mobile

4.3 DC MOTOR

DC motors are commonly used in applications ranging from robotics to medical devices. DC motors convert electrical power into mechanical power in a fairly simple manner.While the hypothesis behind how an electric engine functions is moderately clear, really using the engine in a circuit is a smidgen more shapeless. There are various approaches to control the force and bearing of a DCmotor. We create motor driving using an H-bridge to control the direction of the motor in either direction.

4.4 ICl293D DRIVER

The output of the microcontroller is digital data values. It has to be converted to change voltages, since we use a driver for it called ICl293D driver. It converts the digital values into corresponding voltages and gives it to the motor attached in

the robotic wheelchair. Similarly, it changes the polarity of the output voltage depending on the microcontroller output.

4.5 TGAM MODULE

The TGAM module can handle and output frequency spectrum brainwave, quality electroencephalography, original and brain waves three neurosky esense: parameter focus, relax and saturability blink detection. and human interface only need a simple dry contact point, therefore can easily used in toy, video game and health equipment, and since the energy, suited for battery powered portable consumer products.

5.EXPERIMENTAL RESULTS

We have Controlled wheelchair through Bluetooth Module. Psyche wave Headset remember a cathode for forward portion of scalp reference terminal and ground anode which is associated with ear projectionThe brain sense (BCI) Mind wave Headset used as an EEG Electrode and the hardware setup of system; two-wheel robot is controlled with brain wave headset. Then the output value measured on Serial port of Arduino. It Shows level of Attention. So, the led are controlled by mind wave headset. Led's are more brighter when attention increases.

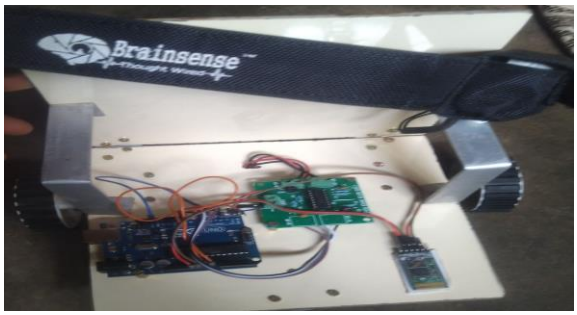

Fig -3: Experimental Results

6. CONCLUSIONS

The various operations of the robotic wheelchair are controlled i.e., its movement was performed by sensing the brain wave signals from the mind wave mobile. The voltage values to the robotic wheelchair motor are produced depending on the control signals from the microcontroller. This prototype can be applied to control the other advanced equipment such as robotic wheelchair arm, wheelchair and dentist. Future work will include the combination of different readings with the use of more sophisticated devices equipped with more electrodes. Moreover, a large sample of users will be tested to qualitatively measure the effectiveness of the system. Furthermore, a third prototype will be developed with the robotic wheelchair performing more functionality with the help of custom BCI devices. Finally, other physiological data will be extracted including body posture and facial expressions so that it will be possible to determine the user's visual attention.

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